FERTILIZER NEEDS

OF

NORTH CAROLINA SOILS

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ERTILIZER NEEDS OF NORTH CAROLINA SOILS—HOW TO SUPPLY THEM

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Division of Agronomy

n far too many cases the soils of North Carolina have been lowered producing power to a point at which the profitable production of s at normal prices is barely possible. In order that such soils may uilt up to remunerative crop production it is necessary for farmers ractice the following restorative methods:

ystematic crop rotation in which suitable legumes are grown with the main money crops. After growth, these legumes should be handled in such a way as to gradually build up the organic matter and nitrogen supplies of the soil. This cannot generally be done except some of the legumes be plowed in at least in part.

se of commercial fertilizers and lime in such a way as to supplement the legumes plowed in or manure added, so that crops grown on each different kind of soil will be provided with the approximate amounts of the different plant-food constituents in suitable and available forms, needed to make moderately large and profitable yields.

landling the crops after production in such a manner as to secure the largest possible returns from them, considering the drain each is making upon the plant-food resources of the soil.

se of the best methods of preparation of the land and cultivation of crops as well as the use of improved and locally adaptable seed of each crop for planting purposes.

orth Carolina's prospect for future supremacy, both agriculturally industrially, will slowly fade away and she will lose her place in business world if the agriculture of the State is not made reasonably itable. This cannot be done unless her soils are maintained in a ly productive state. There can hardly be a doubt that in future food supply will, to a large extent, determine the fate of sections, es and nations. Its lack, or scarcity and high price, has been a rmining factor of their decline in the past. As one of the important ors in economic production involves the intelligent use of refuse lucts of the farm and of commercial forms of plant food, it seems ropriate at this time to issue the general information given below reference to North Carolina soils, their needs, and economical ns of meeting them.

SHOULD KNOW HOW TO FERTILIZE

ith a knowledge of the effect of adding different plant-foods, com- d with information relative to the needs of the soils and the crops, y farmers of the State are enabled to grow large crops by the use

of suitable fertilizer mixtures which do not cost as much as do o
used by other farmers who do not have this information.

To many people the fertilization of crops like corn or cotton s
a simple matter, yet with the boll weevil reducing the cotton yield
with the low price of corn, the selection of certain fertilizing mate
and the best time to apply them are important factors in the net re
secured.

In the past, with cash in hand and a knowledge of what was requ
suitable fertilizing materials could have been purchased and mix
home with quite economical results.

In order to increase the producing power of North Carolina soi
is advisable to have legume crops occur frequently in the crop rota
Some of these should go back into the soil for soil improving purp
On most of our soils lime will prove beneficial when legumes
grown. Before purchasing, the price at the quarry should be obta
based on the analysis, fineness of material, and freight rate to the ne
railway station.

STRENGTH AND WEAKNESSES OF NORTH CAROLINA SOIL

In every soil there are generally two kinds of plant food, pote
and active or available. The potential is the reserve plant food tha
plant may draw upon in the future, provided proper methods of h
ling the soil are put into operation. The active or available plant
is that which is soluble in the soil water and is in a form which p
can take up in their growth during a normal growing season.

It does not necessarily follow, although usually the case, that bec
a soil shows marked and paying results from the use of any plant-
constituent—for instance, phosphoric acid—that the soil is low in
quantity of this constituent. The same condition would apply to n
gen and potash. It might be that the soil is well supplied with
plant-food constituent, but that this particular one was held or lo
up in such an insoluble form in the soil that crops could not for the
secure it for their growth. On the other hand, we might have a
that did show a certain constituent—say, phosphoric acid—whic
greatly needed to be applied at the present time to secure goodly yi
yet the analysis of the soil might show that the particular soil was
low in content of phosphoric acid, and hence is in need of addition
phosphoric acid in available form. In those two cases the prob
of handling the two classes of soils are entirely different. One is lar
a problem of making available the plant-food reserves of the soil, w
the other is that of supplying the needed plant food or foods at
present, or in a short time, because of the too low reserve of it or t
in the soil for goodly yields of crops.

How North Carolina Soils Stand in Plant Food—Below is gi
a table showing the plant-food reserves of prominent North Caro
soil types as brought out by chemical analysis and by the numbe

n crops, for instance, required to remove the different kinds of plant ds contained in the different soils. The total plant-food reserves as follows:

AVERAGE COMPOSITION OF MAIN TYPE SOILS OF NORTH CAROLINA

TYPE	Pounds Plant Food in Surface 6-2/3 inches			No. 50 bushel Corn Crops When Removed Required to Exhaust Different Constituents of the Soil		
	Nitrogen (N)	Phosphoric Acid (P_2O_5)	Potash (K_2O)	(N) Nitrogen	Phosphoric Acid (P_2O_5)	Potash (K_2O)
IN COASTAL PLAIN						
folk Sandy Loam	603	422	5,940	8.0	16.0	140.0
folk Fine Sandy Loam	819	654	5,340	11.0	25.0	126.0
folk Fine Sand	665	674	5,232	9.0	25.0	123.0
folk Sand	759	857	11,038	10.0	32.0	260.0
tsmouth Fine Sandy Loam	1,400	481	9,565	19.0	18.0	225.0
tsmouth Sandy Loam	2,140	463	7,140	29.0	18.0	168.0
tsmouth Fine Sand	3,874	417	5,198	52.0	16.0	122.0
ville Fine Sandy Loam	1,360	600	1,740	18.0	23.0	41.0
ck	3,704	1,735	8,019	50.0	66.0	189.0
IN PIEDMONT REGION						
il Sandy Loam	801	571	49,260	11.0	22.0	1,159.0
il Clay Loam	1,179	819	8,183	16.0	31.0	193.0
il Clay	1,285	1,450	17,743	17.0	55.0	418.0
dell Loam	903	2,840	4,849	12.0	107.0	114.0
cklenburg Clay	1,307	2,851	10,118	18.0	108.0	238.0
nville Sandy Loam	614	654	16,275	8.0	25.0	383.0
rham Sandy Loam	434	302	6,337	6.0	11.0	149.0
IN MOUNTAIN REGION						
kaway Loam	3,160	3,320	33,600	43.0	125.0	791.0
ter's Sandy Loam	2,394	1,152	64,853	32.0	44.0	1,526.0
ter's Loam	2,010	2,330	38,285	27.0	88.0	901.0
ter's Clay	1,454	860	12,416	20.0	33.0	292.0

It will be noticed from the above data, obtained in our soil work, that e predominantly typical soils of the Coastal Plain and Piedmont gions of the State are much more poorly supplied, generally, with rogen, phosphoric acid, and potash, especially nitrogen and phospho- acid, than are the typical cultivable mountain soils.

Coastal Plain Soils—The main deficiencies, as shown by analysis, most of the soils in the Coastal Plain section are in phosphoric acid d nitrogen, with potash coming third. Field results have shown that hough the potash in soils of this section is contained generally in irly large amounts, it evidently is not in as readily available form, shown by the response from its use, especially on the coarser sandy ils, as in soils of the upper section of the State. The phosphoric id, although small in quantity, is contained in quite an available form,

and for this reason field results have shown this constituent to be es important and potash more important than chemical analyses of h soil would seem to indicate. In a general way, most of the soil of i section of the State, however, may be said to be too low in phosph acid and nitrogen for the most profitable growth of such crops as co and tobacco, except those well supplied with organic matter, like h mucks and some of the soils of the Portsmouth series.

Piedmont Soils—The prevailing types of soil in this section the State, as shown by analyses in the table as well as by continued fi experiments, are deficient mainly in nitrogen and phosphoric acid, x cept the Iredell loam and Mecklenburg clay loam soils, which are fa high in content of phosphoric acid and have been shown by field exp ments do not return usually profitable results from the use of mater carrying this constituent in available form. Potash used on these la soils has usually shown up profitably for general crops like cot This latter constituent has not generally been found so highly essen with most general crops grown on the other more important and x tensive types of soil of the Piedmont section of the State, especially w they are handled properly.

Mountain Soils—As will be seen from the analyses, many of soils of this section are generally potentially fairly well supplied w plant food, especially potash. Continued field results with differ crops, however, have shown that phosphoric acid generally is essen with most of the soils of the mountains for best paying results. So of the bottomlands (Toxaway) have shown that the use of potash available form has given paying results, especially so when this c stituent is selling at anything like normal prices. Nitrogen, with upland soils low in organic matter as well as with many of the bott lands of the mountain section, is necessary to be applied in commer forms for best paying returns, with most crops that have a high s ing price.

With soils of all sections of the State, when handled properly when suitable legumes are grown in rotation with the main mo crops and when a part or all of these legumes are turned under, it comes necessary to use lime in most cases in order to secure best res in their improvement.

KIND OF FERTILIZER MIXTURES TO USE FOR BEST RESULT

Based Upon Averages of Field Findings

More and more as the available reserve plant-food supplies of m of our North Carolina soils grow smaller and smaller, as shown by diminished yields on many farms, it becomes necessary for farmers exercise the greatest possible care, in buying fertilizers and fertiliz materials, to have them meet most economically the needs of their gr ing crops. This is particularly essential when plant-food constitue are selling high and when crops are bringing below normal prices.

Although the use of commercial fertilizers alone is seldom, if ever, means of building up the fertility of any soil, nevertheless their use most of our North Carolina soils is essential in any rational system soil building. This is true if farmers are to increase the productiveness of their soils in anything like a permanent and economic way. The se use of fertilizers, coupled with proper systems of crop rotation, which legumes and other crops are grown and part of them and their sidues find their way back into the soil to build up the organic reurces of the soil, as has been repeatedly shown by the field results of e Division, is the plan, when followed, that is not only going to inease the fertility of the soil in a permanent way, but is the one which ill usually afford the greatest returns from the wise selection and use fertilizers, and at the same time will give the greatest net returns.

The humus supplied by the decaying organic matter of crops, crop sidues, farm manures, straw, and vegetation of all kinds plowed back to and thoroughly incorporated with the soil to a large extent supies the life of the soil. The presence of this humus in the soil is sential to the growth and activity of soil bacteria. The normal tivity of these bacteria is necessary for the soil to be in a live, healthy ndition. Generally, outside of soils recently reclaimed from under ater, a dead soil is one deficient in organic matter. A soil in this contion is usually a very poor yielding one. Even when the best kinds fertilizers are used on them and conditions of preparation, seeding nd cultivation are properly looked after, they do not respond nearly bountifully to additions of fertilizers as do soils that have been envened by the presence of a goodly supply of well-rotted organic matter. oils are like animals in one respect: if they are to perform their best ork they must be maintained in a good healthy condition, and to do is with soils they must contain a fair content of humus or well-rotted rganic matter.

Keeping clearly in mind the prime importance of this material in aintaining or building up soil fertility, we now turn to the question f immediate annual returns. Ordinarily, the farmer who sacrifices verything, including the future productiveness of his soil, in getting ie highest possible annual returns, is making a great mistake. The ise policy is to so fertilize his crops and handle his soil that in getting oodly yields his soil, by the method indicated above, will naturally be ncreasing in productiveness from year to year. In using commercial rtilizers, as a general thing, different crops grown on different soils ill each have different requirements. As the land is improved, its equirements for the additions of the different plant-food constituents nitrogen, phosphoric acid, and potash) may change somewhat. For nstance, as the organic matter supply of the soil is increased, the perntage of nitrogen required to be added in fertilizers or manures may e in some cases decreased. The same may hold true with reference to otash applications with soils now containing vast supplies of this con-

stituent in a form which plants cannot at present utilize because of it insoluble forms. It may be that when such soils are well stored w decaying organic matter these vast resources will be made available growing crops to such an extent as to make it possible to reduce potash requirements from commercial sources. However, at the pre time and probably for some time to come, in most cases for aver soils low in organic matter it is suggested, after thorough considera of the findings of field experiments with different crops produced the more important types of soil occurring in North Carolina, that following formulas, which are more concentrated than those gener used when buying mixed fertilizers, be purchased by farmers who fertilizers during the coming year for fertilizing their crops on aver soils of the Coastal Plain, Piedmont and Mountain sections of State.

Crop	Region	Soil Type	Fertilizer Mixture
Irish potatoes	Coastal Plain	Sandy loams	6–
Truck crops	Coastal Plain	Sandy or sandy loams	7–
Tobacco	Coastal Plain	Rather sandy but containing a moderate amount of organic matter	8–
Peanuts and other legumes	Coastal Plain	Sandy loams	10–
Tobacco	Coastal Plain	Sandy loams	8–
Sweet potatoes	Coastal Plain	Sandy or sandy loams	8–
Corn, cotton and small grains	Coastal Plain	Sandy loams	8–
Legumes	Piedmont and Mountain	Loams	10–
Cotton	Piedmont	Clays and clay loams	10–
Tobacco	Piedmont and Mountain	Sandy loams	10–
Truck crops	Piedmont and Mountain	Clays and clay loams	10–
Sweet potatoes	Piedmont and Mountain	Sandy loams	12–
Corn and small grains	Piedmont and Mountain	Clays and clay loams	12–
Legumes	Piedmont and Mountain	Good clays and clay loams containing an average amount of organic matter	12–
Cotton	Piedmont	Light, silty, slaty loams containing moderate amounts of organic matter. On poorer soils, a side application of some soluble form of ammonia will frequently be advisable for best results	12–8

In the mixtures given above, the first figure in the last column percentage of available phosphoric acid, the second ammonia, and t third potash.

HOME MIXING OF FERTILIZERS

The use of fertilizers to increase crop yields in North Carolina is a ry old practice, and the amount used for this purpose is increasing h year. As farmers learn more about what their soils are deficient and the demands of the different crops for certain plant foods, there a greater demand for mixed fertilizers containing plant-food materials proportions not put out by the fertilizer people at the present time. his is only one of the many reasons for the growing demand for raw terials to be mixed on the farm.

Some advantages in home-mixing of fertilizers are:

(1) A knowledge of the kind and quality of plant food bought.
(2) The use of the different plant foods in any proportion desired.
(3) Generally, a saving in the cost per ton.

Some of the disadvantages are:

(1) Hard to secure raw materials.
(2) The mixing is not usually as perfect as are factory mixed goods.
(3) Not ground as finely as manufactured products.

The following table will be very helpful in making home mixtures, en it is found advisable to do so.

QUANTITIES OF FERTILIZING MATERIALS TO USE TO GIVE DEFINITE PERCENTAGE IN A TON OF FERTILIZER

Carriers of Nitrogen

MATERIAL	1 per cent	2 per cent	3 per cent	4 per cent	5 per cent	6 per cent	7 per cent	8 per cent
rate of Soda 15 per cent N)	133	266	400	532	666	800	933	1,066
rate of Ammonia 30 per cent N)	66	133	200	266	333	400	466	533
phate of Ammonia 20 per cent N)	100	200	300	400	500	600	700	800
ttonseed Meal 7 per cent N)	285	571	856	1,142	1,428	1,714	2,000	------
ed Blood 10 per cent N)	200	400	600	800	1,000	1,200	1,400	1,600
h Scrap 10 per cent N)	200	400	600	800	1,000	1,200	1,400	1,600
cium Cyanamid 15 per cent N)	133	266	400	532	666	800	933	1,066

Carriers of Potash

Material	1 per cent	2 per cent	3 per cent	4 per cent	5 per cent	6 per cent	7 per cent	8 per cent
Sulphate of Potash (50 per cent potash)-----	40	80	120	160	200	240	280	2
Muriate of Potash (50 per cent potash)-----	40	80	120	160	200	240	280	2
Nebraska Lake Potash (22 per cent potash)-----	90	180	270	360	450	540	630	7
Kainit (12 per cent potash)-----	166	333	500	666	833	1,000	1,166	1

Carriers of Phosphoric Acid

Material	6 per cent	7 per cent	8 per cent	9 per cent	10 per cent	11 per cent	12 per cent	13 per cent	1 p c
Acid Phosphate (16 per cent)-----	750	875	1,000	1,125	1,250	1,375	1,500	1,625	1,
Basic Slag (18 per cent)-----	666	777	888	1,000	1,111	1,222	1,333	1,444	1,
Ground Bone (23 per cent)-----	522	609	696	783	869	956	1,043	1,130	1,

Note: Where the total amount of materials mixed makes more or less than 2, pounds, multiply the amount decided to apply per acre by the number of pou mixed and divide by 2,000. This will give the amount of the fertilizer mixt to use per acre.

Example: To make the equivalent of a ton of an 8-5-3 fertili using 16 per cent acid phosphate, 15 per cent nitrate of soda, and per cent muriate of potash, use 1,000 pounds of acid phosphate, 6 pounds of nitrate of soda, and 120 pounds of muriate of potash. the total of these will be 1,786 pounds, which will contain the sa amounts of phosphoric acid, nitrogen, and potash as will be contain in 2,000 pounds of an 8-5-3 goods, it will only be necessary to use pounds of this mixture for 2 pounds of the 8-5-3 mixture to get t same amount of the plant-food constituents added to the soil.

Certain materials should not be mixed together and left standi such as lime or basic slag with ammonium sulphate or barnyard manu

COMPOSITION OF GERMAN POTASH SALTS

COMPOUNDS CONTAINED	COMMERCIAL FORMS OF POTASH				
	Kainit—per cent	Sulphate of Potash—per cent	Sulphate of Potash and Magnesia—per cent	Muriate of Potash—per cent	Manure Salts—per cent
phate of Potash (K_2SO_4)	21.3	90.6	50.4		2.0
riate of Potash (KCl)	2.0	1.6		83.5	31.6
phate of Magnesia ($MgSO_4$)	14.5	2.7	34.0	0.4	10.6
oride of Magnesia ($MgCl_2$)	12.4	1.0		0.3	5.3
oride of Sodium (NaCl)	34.6	1.2	2.5	14.5	40.2
phate of Lime ($CaSO_4$)	1.7	0.4	0.9		2.1
oluble Substances	0.8	0.3	0.6	0.2	4.0
ter	12.7	2.2	11.6	1.1	4.2
gnesia (MgO)	10.1	1.3	11.4		5.8
nimum Guaranteed Potash (K_2O) per cent	12.4	48.6	25.9	50.5	20.0

LIST OF FERTILIZER MANUFACTURERS FROM WHOM PRICES OF MATERIALS MAY BE OBTAINED

Acme Manufacturing Company, Wilmington, N. C.
Albemarle Fertilizer Company, Elizabeth City, N. C.
American Agricultural Chemical Company, Norfolk, Va., and Henderson, N. C.
American Cotton Oil Company, Wilmington, N. C.
American Fertilizer Company, Norfolk, Va.
Armour Fertilizer Works, Wilmington, Greensboro, and Aberdeen, N. C.
Ashcraft-Wilkinson Company, Atlanta, Ga.
Atlantic Chemical Corporation, Norfolk, Va.
Baker, E. N., & Company, Wadesboro, N. C.
Baugh & Sons, Norfolk, Va.
Bertie Cotton Oil Company, Aulander, N. C.
Blue Fertilizer Company, Aberdeen, N. C.
Bragaw Fertilizer Company, Washington and Wilmington, N. C.
Bryant Fertilizer Company, Alexandria, Va.
Burton, C. J., Guano Company, Baltimore, Md.
Caraleigh Phosphate and Fertilizer Works, Raleigh, N. C.
Carolina Union Fertilizer Company, Norfolk Va., and Baltimore, Md.
Catawba Fertilizer Company, Lancaster, S. C.
Charleston Importing and Forwarding Company, Charleston, S. C.
Cheraw Oil and Fertilizer Company, Cheraw, S. C.
Christian-Ewing Company, Fayetteville, N. C.
Coe-Mortimer Company, New York, N. Y.
Columbia Guano Company, Norfolk, Va.
Conestee Chemical Company, Wilmington, N. C.
Contentnea Guano Company, Wilson, N. C.
Cooperative Warehouse Company, Winston-Salem, N. C.
Coweta Fertilizer Company, Newnan, Ga.
Craven Chemical Company, New Bern, N. C.
Dawhoo Fertilizer Company, Charleston, S. C.
Dixie Guano Company, Laurinburg, N. C.
Dockery Mercantile and Manufacturing Company, Rockingham, N. C.

Eastern Cotton Oil Company, Hertford, N. C.
Etiwan Fertilizer Company, Charleston, S. C.
Farm Equipment Company, Baltimore, Md.
Farmers Cotton Oil Company, Wilson, N. C.
Farmers Guano Company, Norfolk, Va., and Raleigh, N. C.
Farmers Storage Company, Edenton, N. C.
Fisheries Products Company, Wilmington, N. C.
Fremont Cotton Oil Mill Company, Fremont, N. C.
Georgia Chemical Works, Augusta, Ga.
Greenville Oil and Fertilizer Company, Greenville, N. C.
Hall Tobacco Chemical Company, Durham, N. C.
Harby & Company, Sumter, S. C.
Hardison & Hardison, Wadesboro, N. C.
Hartsville Fertilizer Company, Hartsville, S. C.
Home Fertilizer and Chemical Company, Baltimore, Md.
Hubbard, M. P., & Co., Baltimore, Md.
International Agricultural Corporation, Charlotte, N. C.
Josey, N. B., Company, Tarboro and Wilmington, N. C.
Lee County Cotton Oil Company, Sanford, N. C.
Lenoir Coal and Ice Company, Kinston, N. C.
Liberty Manufacturing Company, Red Springs, N. C.
McCabe Fertilizer Company, Charleston, S. C.
McMurphy Fertilizer Company, Charleston, S. C.
Maybank Fertilizer Company, Charleston, S. C.
Meadows, E. H. and J. A., Company, New Bern, N. C.
Merchants Fertilizer Company, Charleston, S. C.
Merchants Fertilizer and Phosphate Company, Charleston, S. C.
Miller Fertilizer Company, Baltimore, Md.
Morris Fertilizer Company, Wilmington, N. C.
Navassa Guano Company, Wilmington, N. C.
New Bern Cotton Oil and Feed Company, New Bern, N. C.
Nitrate Agencies Company, Wilmington, N. C.
Ober, G., & Sons Company, Baltimore, Md.
Old Buck Guano Company, Richmond, Va.
Pamlico Chemical Company, Washington, N. C.
Pearsall & Company, Wilmington, N. C.
Peruvian Guano Corporation, Charleston, S. C.
Phillips Fertilizer Company, Washington, N. C.
Piedmont-Mount Airy Guano Company, Baltimore, Md.
Planters Fertilizer and Phosphate Company, Charleston, S. C.
Pocahontas Guano Company, Lynchburg, Va.
Pocomoke Guano Company, Norfolk and Lynchburg, Va.
Powhatan Chemical Company, Richmond, Va.
Priddy, Chas., & Co., Norfolk, Va.
Pringle, B. G., & Co., Charleston, S. C.
Producers Cooperative Exchange, Richmond, Va.
Rasin Monumental Company, Baltimore, Md.
Read Phosphate Company, Charleston, S. C.
Richmond Guano Company, Richmond, Va.
Robersonville Guano Company, Robersonville, N. C.
Robertson Chemical Corporation, Norfolk, Va.
Robeson Manufacturing Company, Lumberton, N. C.
Royster, F. S., Guano Company, Norfolk, Va.
Scotland Neck Guano Company, Scotland Neck, N. C.
Seminole Phosphate Company, Goldsboro, N. C.
Smith Reduction Corporation, Norfolk, Va.

Southern Agricultural Chemical Corporation, Atlanta, Ga.
Southern Cotton Oil Company, Fayetteville, Rocky Mount, Wilson, Gibson, and Wadesboro, N. C.
Southern Fertilizer and Chemical Company, Savannah, Ga.
Swift & Co., Greensboro, Charlotte, and Wilmington, N. C.
Tennessee Chemical Company, Greensboro, N. C.
Tidewater Guano Company, Norfolk, Va.
Union Guano Company, Wilson and Winston-Salem, N. C.
Upshur, R. L., Guano Company, Norfolk, Va.
Vance Guano Works, Henderson, N. C.
Virginia-Carolina Chemical Company, Richmond, Va.
Wessel, Duval & Co., Charleston, S. C.
Wulborn Fertilizer Company, Charleston, S. C.

)URCES AND PRICES OF VARIOUS TYPES OF LIME ON MARKET

(All prices are based on loaded cars at shipping point)

IERICAN LIMESTONE COMPANY, KNOXVILLE, TENN.

'Mascot" limestone. 38 per cent magnesium carbonate and 52 per cent cal-m carbonate, which is equivalent to 95 per cent total carbonates. 80 per t of lime passes 100-mesh screen and 60 per cent passes 200-mesh. Kiln-ied. Price per ton: $2.70 in bulk, $3.95 in 100-lb. paper or 200-lb. burlap gs. 33 tons minimum car.

UE RIDGE LIME COMPANY, ASHEVILLE, N. C. (Works at Fletcher, N. C.)

Magnesian limestone. Finely pulverized. Guaranteed 94 to 96 per cent al carbonates. Price per ton: $2.75 in bulk, $4.00 in 100-lb. paper or 200-lb. rlap bags. 33 tons minimum car.

INCHFIELD LIME COMPANY, ASHEVILLE, N. C. (Works at Linville Falls, N. C.)

Magnesian limestone. Finely pulverized. Guaranteed 94 to 96 per cent al carbonates. Price per ton: $2.75 in bulk, $4.00 in 100-lb. paper or 200-lb. rlap bags. 33 tons minimum car.

QUO LIME SALES COMPANY, COLUMBIA, S. C. (Works at Hot Springs, N. C.)

Magnesian limestone. Finely pulverized. 96 to 99 per cent total carbonates, which 42 per cent is carbonate of magnesium. Price per ton: $2.70 in lk, $3.95 in 100-lb. paper or 200-lb. burlap bags. 30 tons minimum car.

LBERT LIMESTONE PLANTS, MARION, VIRGINIA.

Limestone. Fineness of grinding complies with Virginia law. Guaranteed per cent calcium carbonate and 2 per cent magnesium carbonate. Price r ton: $2.00 in bulk. Not sold in bags. 30 tons minimum car.

IO C. BARBER FERTILIZER COMPANY, BARBER, VIRGINIA.

Precipitated Lime-Marl (a form of calcium carbonate). 92-98 per cent cal-m carbonate. 50 per cent passes 100-mesh screen. Thoroughly dried. Price r ton: $2.50 in bulk, $4.00 in 200-lb. burlap bags, $4.25 in 100-lb. paper bags. tons minimum car.

AUNTON LIME PRODUCTS COMPANY, STAUNTON, VIRGINIA.

Ground Burnt Lime. Contains about 75 per cent calcium oxide. Price per n: $8.50 in 200-lb. burlap sacks. 25 cents per ton discount for cash. 15 tons inimum car.

Powhatan Lime Company, Strasburg Junction, Virginia.

Burnt and Hydrated Lime. *Prices per*

Agricultural lump lime in bulk..... $
Agricultural hydrated, 50-lb. paper bags.....
Agricultural ground lime, 167-lb. burlap bags.....
25 cents per ton discount for cash. 15 tons minimum car.

Blue Grass Lime Company, Maxwell, Virginia.

Freshly burnt and hydrated lime (partly air-slaked). Price per t
Freshly burnt, $4.50 in bulk; agricultural hydrated, $3.00 in bulk and $4.5
burlap bags. Made from limestone carrying 95 to 98 per cent calcium
bonate. 15 tons minimum car.

A. S. Lee & Sons Company, Norfolk, Virginia.

Oyster-shell limes. Burnt and hydrated and run through fine scre
Guaranteed 55 per cent CaO. Prices per ton:

Lee's Excelsior Prepared Agricultural Lime with 4 per cent potash.....$1
Lee's Prepared Agricultural Lime with 2.25 per cent potash..... 1
Lee's No. 1 Shell Agricultural Lime—no potash, in bulk.....
Lee's No. 1 Shell Agricultural Lime—no potash, in 200-lb. sacks.....
15 tons minimum car.

Riverton Lime Co., Riverton, Virginia.

Burnt and Hydrated Lime. Guaranteed analysis, 75 per cent oxide
calcium and 15 per cent oxide of magnesium. Prices per ton: Lump lime
bulk, $8.00; ground lime in 100-lb. burlap bags, $9.50; hydrated lime in
lb. paper bags, $9.50.

	American Limestone Co., Knoxville, Tenn.	Blue Ridge Lime Co., Asheville, N. C.	Clinchfield Lime Co., Asheville, N. C.	Buquo Lime Sales Co., Columbia, S. C.	Culbert Limestone Plant, Marion, Va.	Ohio C. Barber Fertilizer Co., Barber, Va.	Staunton Lime Products Co., Staunton, Va.	Powhatan Lime Co., Strasburg Junction, Va.	Lime Co., Hertford, N. C. Quarry at Maxwell, Va.	A. S. Lee & Sons Co., Norfolk, Va.
KIND OF LIME	Limestone	Limestone	Limestone	Limestone	Limestone	Limestone	Burnt Lime	Burnt and Hydrated	Hydrated (Partially Air-slaked)	
Price in Bulk	$ 2.70	$ 2.75	$ 2.75	$ 2.75	$ 2.00	$ 2.50	$ 4.50	$ 7.50	$	$
Price Bagged	3.95	4.00	4.00	4.00		4.00	5.50	9.00	6.00	9.50
FREIGHT TO—										
Asheville	$ 1.26	$ 0.68	$ 1.35	$ 1.21	$ 2.07	$		$ 4.84	$ 4.84	$ 4.15
Charlotte	1.71	1.35	1.69	1.66	1.89	2.64		4.17	4.17	3.60
Durham	1.89	1.69	2.70	1.84	2.10	2.55			3.37	2.62
Elizabeth City	2.58	2.34	3.38	2.56	2.61	2.74		2.93	2.93	1.18
Fayetteville	2.25	2.25	2.93	2.43	3.83	3.17		3.94	3.94	2.69
Greensboro	1.80	1.53	1.80	1.75	1.80	2.37		3.72	3.94	3.06
Goldsboro	1.98	1.80	2.25	1.93	1.98	2.73		3.38	3.38	2.52
Hamlet	2.37	2.03	2.03	2.32		3.39	3.50		3.94	3.15
Henderson	1.98	1.80	2.14	1.84	3.71	2.55	to		3.83	2.26
Hickory	1.53	1.17	1.35	1.48	1.98	2.73	4.50		4.50	3.70
New Bern	2.34	2.48	2.99	1.47					2.82	2.52
North Wilkesboro	1.89	1.62	2.03	1.84	1.98	2.73			4.39	3.70
Raleigh	1.89	1.71	2.03	1.84	1.89	2.64		3.83	3.83	2.62
Rocky Mount	2.70	2.37	2.92	2.65		2.94			3.72	2.16
Salisbury	1.62	1.44	1.69	1.57	1.89	2.55			4.05	3.50
Sanford	1.89	1.71	2.03	1.84	3.83	2.55			3.94	2.79
Washington	2.34	2.48	3.15	2.29	2.93	3.06		3.04	3.04	2.16
Wilmington	2.59	2.37	2.93	2.55	3.28	3.28		3.04	3.04	2.97

NOTE: Although the above freight rates are essentially correct, they cannot be guaranteed.